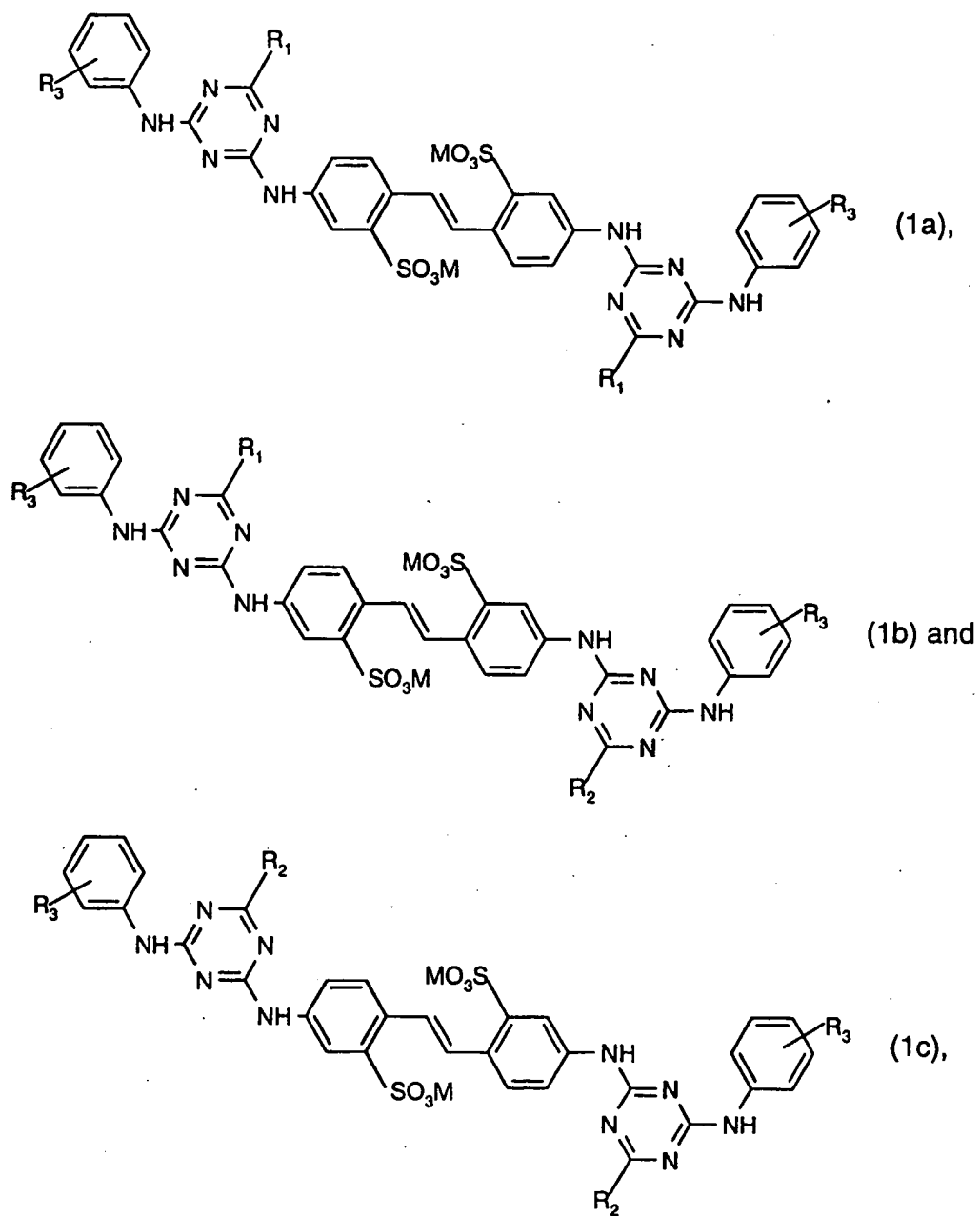


Claims

1. A fluorescent whitening agent, which comprises a mixture of compounds of the formulae



in which

R_1 and R_2 are different and each represents $-NH_2$, $-NHC_1-C_4alkyl$, $-N(C_1-C_4alkyl)_2$,

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-NHC₂-C₄hydroxyalkyl, -N(C₂-C₄hydroxyalkyl)₂, -N(C₁-C₄alkyl)(C₂-C₄hydroxyalkyl), a morpholino, piperidino or pyrrolidino residue or an amino acid or an amino acid amide residue from which a hydrogen has been removed from the amino group, each R₃, independently, represents hydrogen, C₁-C₄alkyl or C₁-C₄alkoxy and M represents hydrogen, an alkali metal atom, ammonium or a cation formed from an amine.

2. A composition according to claim 1, in which R₃ represents hydrogen.

3. A composition according to claims 1 or 2, in which the aliphatic amino acid or amino acid amide residue is of the formula



in which each

R₄ and R₄', independently, represent hydrogen or a group having the formula

-CHR₅R₆ in which

R₅ and R₆, independently, are hydrogen or C₁-C₄alkyl optionally substituted by one or two substituents selected from the group consisting of hydroxy, thio, methylthio, amino, carboxy, sulfo, phenyl, 4-hydroxyphenyl, 3,5-diiodo-4-hydroxyphenyl, β-indolyl, β-imidazolyl and NH=C(NH₂)NH-.

4. A composition according to claim 3, in which residues R₁ and/or R₂ are derived from glycine, alanine, sarcosine, serine, cysteine, phenylalanine, tyrosine (4-hydroxyphenylalanine), diiodotyrosine, tryptophan (β-indolylalanine), histidine ((β-imidazolylalanine), α-aminobutyric acid, methionine, valine (α-aminoisovaleric acid), norvaline, leucine (α-aminoisocaproic acid), isoleucine (α-amino-β-methylvaleric acid), norleucine (α-amino-n-caproic acid), arginine, ornithine (α,δ-diaminovaleric acid), lysine (α,ε-diaminocaproic acid), aspartic acid (aminosuccinic acid), glutamic acid (α-aminoglutaric acid), threonine, hydroxyglutamic acid and taurine, as well as mixtures and optical isomers thereof, or from iminodiacetic acid or from N-(propionamido)-N-(2-hydroxyethyl)amine.

5. A composition according to claims 1 or 2, in which

R₁ and R₂ represent -NHC₂-C₄hydroxyalkyl, -N(C₂-C₄hydroxyalkyl)₂, -N(C₁-C₄alkyl)(C₂-C₄hydroxyalkyl), a morpholino residue or a residue derived from glycine, sarcosine, taurine, glutamic acid, aspartic acid or iminodiacetic acid.

6. A composition according to claim 5 in which

R_1 and R_2 represent a mono-(2-hydroxyethyl)amino, a di-(2-hydroxyethyl)amino, a di-(2-hydroxypropyl)amino, an N-(2-hydroxyethyl)-N-methylamino, an aspartic acid, an iminodiacetic acid or a morpholino residue.

7. A composition according to any one of claims 1 to 6, in which

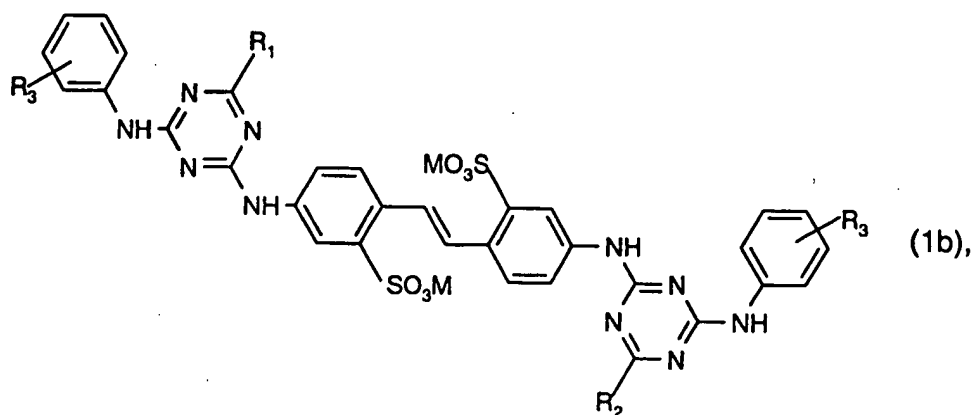
M represents hydrogen, lithium, potassium, sodium, ammonium, mono-, di-, tri- or tetra- C_1 - C_4 alkylammonium, mono-, di- or tri- C_1 - C_4 hydroxyalkylammonium or ammonium that is di- or tri-substituted with a mixture of C_1 - C_4 alkyl and C_1 - C_4 hydroxyalkyl groups.

8. A composition according to claim 7, in which

M represents hydrogen, potassium or sodium.

9. A process for the preparation of the compound mixture of formulae (1a), (1b) and (1c) by reacting, under known reaction conditions, cyanuric chloride, successively, in any desired sequence, with each of 4,4'-diaminostilbene-2,2'-disulphonic acid, aniline or an aniline derivative, an amino compound R_1H and an amino compound R_2H , or, alternatively a mixture of amino compounds R_1H and R_2H , R_1 and R_2 being as defined in claim 1.

10. A compound of the formula



in which

R_1 , R_2 , R_3 and M are as defined in claim 1.

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11. Use of a composition, which contains water, a fluorescent whitening agent, which comprises a mixture of the compounds (1a), (1b) and (1c), according to any one of claims 1 to 8, and, optionally, auxiliaries, for whitening synthetic or natural organic materials.
12. Use according to claim 11 as optical brightening agents for paper in pulp, size-press, metering press or coating applications.
13. Paper, which has been optically brightened by the compound mixture of formulae (1a), (1b) and (1c) according to any one of claims 1 to 8.
14. Use according to claim 11, for increasing the Sun Protection Factor (SPF) rating or for the fluorescent whitening of a textile fibre materials.
15. A textile fabric produced from a fibre treated with the compound mixture of formulae (1a), (1b) and (1c) according to any one of claims 1 to 8.